RENEWABLE ENERGY IN THE KIMBERLEY

A REPORT ON STRATEGY AND POTENTIAL FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY IN THE KIMBERLEY

This report was commissioned from Prof Ray Wills of Duda & Wills. It examines the strategies and undertakings available to reduce dependency on non-renewable energy sources in the Kimberley and increase the generations an use of renewable and cleaner energy options - September 2014.

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DUDA&WILLS
Business Government Sustainability

Renewable energy in the Kimberley, Western Australia

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Duda&Wills

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About the author

Professor Ray Wills has had a wide-ranging career at different times as researcher, academic, planner, consultant, adviser, manager and executive. Ray has substantial expertise in ecology, sustainability, climate change science and the effects of expected future climates on Australia and the world, and functional responses to mitigate and adapt to global warming.

Ray is a Director and joint owner of the advisory firm Duda&Wills where he provides specialist strategic advice on market opportunities, business sustainability and corporate social responsibility, and managing external relations and reputation. Ray is also chief adviser to and Board Member and Deputy Chair of the energy chamber, the Sustainable Energy Association of Australia, and Adjunct Professor at The University of Western Australia contributing to the academic program and providing advice to UWA on sustainability.

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Executive Summary

Rapid developments in clean technologies and even more rapid reductions in clean technology pricing mean the nature of the electricity market is changing off- and on-grid in Australia and around the world right now.

Adapting to and taking advantage of these changes will be imperative for economic competitiveness and social development as commercial and domestic customers change the way they acquire and consume energy. Traditional energy utilities will need to adapt or face oblivion, with energy efficiency and self generation from distributed renewable both eroding the old models, and new clean tech-based business models quickly being the new normal.

There is a key challenge to make the most of the opportunity within the Kimberley, and more particularly to avoid decisions that lock in old technology that will then create an expensive legacy that may last for many decades. This seems particularly relevant right now as the Kimberley appears to be lagging behind the installation rates of renewable being experienced the rest of Australia.

This discussion paper is not a technical paper, but rather a strategy paper that summarises relevant global, national and state issues and proposes a range of measures that can remove barriers and promote opportunities for establishing sustainable energy solutions in the Kimberley Region of Western Australia.

The paper contains many ideas that may need basic seed funding to initiate, but should potentially be self-sustaining, in some cases merely requiring an alignment of purchasing strategies so that planned expenditure brings aligned outcomes.

Early initiatives should include:

- As a tool of economic development, establishing a Kimberley Energy Efficiency Fund with the objective of reducing business and community non-discretionary spend on energy and so creating the opportunity for increased discretionary spend for the local economy;
- Build alliances with business, government, institutions and the community to bring on new, or enhance existing, education programs for the public and for technical services in energy efficiency and renewable energy to promote local service delivery and develop local service capacity;
- Increased private uptake of solar PV, storage and solar hot water systems on homes and businesses across the Kimberley;
- Establishing research and development projects targeting the particular needs of the Kimberley, especially to enhance the energy performance of buildings, develop of renewable liquid fuels for transport; and mapping local energy resources in renewable energy to identify most prospective resources;
- A range of larger renewable projects, particularly biomass and solar energy demonstration projects, with at least some integrating RE with existing power generation or incorporating storage, aimed at cutting energy costs for remote centres, including mines, with awareness raising and education as a specific outcome; and
- Demonstration projects that target community and tourist-oriented facilities to maximise exposure and educational value.

Practical timelines on the initiatives above are proposed at the end of the report. A first task in responding to proposed initiatives in this document is to complete the same task for other initiatives outlined in the body of the report.

An immediate secondary task is to encourage new commercial proponents for new renewable energy projects for the Kimberley and facilitate financial support available from ARENA for those projects.

Sustainable energy elements glossary

Sustainable energy (SE) sectors and sources - includes all renewable energy (RE) sources and energy efficiency (EE)

- Energy efficiency
  - domestic and commercial appliances;
  - built environment;
  - demand side management;
  - energy storage;
  - infrastructure;
  - generation and transmission;
  - transport;
  - machinery and vehicles; and
  - manufacturing and industrial processes, industry specific.
- Ecoefficiency
  - Ecoefficiency; and
  - industrial ecology.
- Professional services
  - consulting (including economics, engineering, policy);
  - education and training;
  - legal; and
  - research.
- Biofuels –
  - biogas;
  - bioliquids; and
  - biomass – land based and aquatic (algal photobioreactors)
- Solar power
  - solar photovoltaic (PV); and
  - solar thermal, including solar hot water.
- Geothermal
  - process quality sources; and
  - industrial quality sources.
- Water power
  - hydro and microhydro;
  - wave;
  - tidal; and
  - current.
- Wind power
  - wind and microwind.

Other abbreviations: greenhouse gases (GHG); emissions trading scheme (ETS); Small and Medium enterprises (SMEs)

A world view of renewables

A recent World Energy Council report, *World Energy Perspective: Cost of Energy Technologies 2013* (WEC 2013), reveals renewable component of world electricity generation capacity is now 27% of 5,161 gigawatts (GW) installed, yielding around 22% of generation production.

Industrial, commercial, and residential consumers are increasingly becoming producers of renewable power in a growing number of countries. With $US228 billion committed for renewable technologies 2012, investment in renewable capacity was greater than net investment in new fossil fuel generation for the second year in a row (WEC 2013).

Globally, 45 GW new wind power accounted for about 39% of renewable power capacity added in 2012, followed by hydropower and solar PV, each accounting for approximately 26%.

In 2013 the solar PV industry will install over 30 GW and likely to produce 45 GW in 2014, potentially overtaking installation of wind capacity within the next few years.

What about renewables in Australia?

As of December 2012, Australia is averaging 13.1% renewable energy (RE) generation, with hydroelectricity 58% the largest source, followed by wind 26%, bioenergy 8.1%, and solar PV 8%. South Australia has a larger installed capacity of wind generation than any other state and, given its relatively small total demand, by far the largest share of wind in total electricity supply (Saddler 2013).

The contribution of solar is growing rapidly with the latest data from Australia's Clean Energy Regulator reveals over 1.1 million homes are now equipped with solar photovoltaic panels, with 2.9 GW of installed capacity. In addition, over 650 000 homes have solar hot water systems installed (CER 2013).

Queensland is now the State with the largest amount of installed solar in the nation by both number and capacity with over 936 MW on more than 341 000 installations. South Australia has a much larger share of electricity supplied by rooftop PV than any other state, even Queensland. Western Australia has 320 MW of solar on 144 000 homes and lags behind other states in share of rooftops.

Renewables in the Kimberley

The Ord River Hydro Power Station has a generating capacity of 30 MW of electricity and is the single largest source of RE in the Kimberley. With the installation of rooftop solar, there is now over 6.6 MW of solar generation capacity on 655 homes in the major centres of the Kimberley region, and over 2112 solar hot water systems (Table 1)

Table 1. Solar PV and solar hot water deployment in major centres (by postcode) in the Kimberley. (Data CER 2013, ABS 2007)

Town (postcode)	Population	Households*	Solar PV	PV Capacity kW	Solar HW
Broome (6725)	13078	3,834	322	3398	1103
Kununarra (6743)	3748	1102	171	1038	370
Derby 6728)	3093	909	112	1816	399
Halls Creek (6770)	1211	356	13	112	115
Fitzroy Crossing (6765)	928	273	17	63	83
Wyndham (6740)	669	196	20	226	42
TOTAL	22727	6,670	655	6653	2112

*Estimated

There is no single preferred clean technology because different technology will have varying advantages geographically, which means the costs of several renewable technologies are expected to broadly converge over time, as we are currently seeing with pricing in wind and solar (Parkinson 2013c). Hence, a portfolio of technologies is expected result.

But first, energy efficiency - always

As individuals, businesses and government undertake measures to reduce energy waste and improve energy efficiency (the point is commonly missed, but these are two different things) as well as correcting for power factor, they will ultimately save money and reduce expenditure. The primary tool to counter the effects of energy pricing is to deliver EE – referred to by the International Energy Agency as the hidden fuel (IEA 2013a, Vorath 2013). Efficiency is not just about electricity consumption, but includes the built environment and transport. Long-term energy savings improve productivity and reduce or offset inflationary pressures from rising energy prices that would otherwise impact on the CPI.

Voltage optimisation technologies, power factor corrections, and other approaches to improved energy management can also yield cost savings – savings that have become more significant as the cost of electricity has increased.

For example, households can save in the order of 30% on energy costs through efficiency alone (Cooper 2013), and in buildings, there are many examples of improving lighting efficiency alone yields up to a 20% EE saving. In business, cutting energy use by 30% yields the same bottom line benefits as a 3% increase in rental income, a 10% increase in sales, or a 5% increase in net operating income and so potentially a 10% increase in profit.

Addressing the need and creating opportunities for the Kimberley

All nations are looking for energy security and this is relevant in Australia, and especially important to the Kimberley. A key element of establishing sustainable solutions for energy needs is an integrated approach.

Economically we know freeing up discretionary spending is an important driver of a healthy economy. If some of the savings from reduced non-discretionary spend on utility charges by householders or businesses arrives as discretionary spending within the local economy, this is likely to provide a valuable stimulus to local growth in the Kimberley.

Impediments hampering commercial scale development of sustainable energy projects

A range of issues present barriers to sustainable energy projects in the Kimberley. Overcoming impediments and the search for opportunities must be multi-faceted, integrated, and consistent:

- across levels of Government – Federal, State and Local;
- relevant cross sectoral synergies in relation to the Kimberley: accommodation, building and construction, developers, tourism, agricultural, mining, industrial, infrastructure, transport;
- geographic – across the region, delivering value and contributing to regional development; and

- along supply chains and over life cycles – delivering value cradle to cradle in each part of the supply chain. Poor designs cost money – now and into the future.

To achieve this:

- Planning for integrated, collaborative and coordinated cross-portfolio approaches from Government agencies in the region;
- Strategies to ensure best value delivered through additionality;
- Good legislative support eliminating perverse legislation and perverse subsidies that at worst reduce EE and access to RE and at best are neutral to sustainable energy outcomes with synergistic legislation;
- Regulatory or at least agreed policy-based approach that mandates EE and sets minimum performance standards for all new projects, buildings, infrastructure, machinery, vehicles and other cost points;
- Willingness to introduce innovative energy systems, particularly for distributed generation, by dealing with and overcoming old technology lock-in; and
- Review all planning schemes at local level to remove disincentives in approvals process, aiming for consistency in consent conditions to allow for cost predictability (e.g. remove solar panels from approval requirements), and add incentives (e.g. reduced developer contributions if RE used).

There is a general lack of policies and regulations supporting integrated development of RE technologies into new public and private developments, together with poorly understood view of the commercial competitiveness of RE development, resulting in a continuing bias to business as usual high-emissions energy development.

Examples include:

- embedded fossil-fuel subsidies reducing energy prices which counter clear economic incentives for the uptake of RE, and novel treatment or difficult zoning and permitting processes for RE;
- electricity markets designed for centralized power plants, with out-dated contractual supply agreements and market control by established generators with some decision makers resistant to the adoption of new technologies; and
- inadequate financing options for RE projects, particularly where these may deliver competition with the incumbent generator.

In this context, the Economic Regulation Authority (ERA) and the Independent Market Operator (IMO) rules impact on delivery of EE and RE.

While these are often larger than the Kimberley region, and for the most part change is in the hands of the state government, action in the Kimberley can have potential impacts in:

1. Education needs (both professional and public)

A key impediment in bringing cost-competitive RE to commerce and industries can be found in the resistance from the traditional industry base to change – especially key sectors in the building industry, transport and traditional energy generation.

Education and accessing skills and knowledge is an issue particularly with smaller companies as the required skills often compete with traditional construction

industries, mining engineering or petroleum engineering, even in the current economic environment.

There is a need for skills-based training including for monitoring, auditing, verification. Specialised technical training courses such as energy auditing or solar PV installation need to be supported.

Government's role here includes a regulatory role on information and labelling, offering clarity and transparency for both products and services – truth in advertising and product labelling can help create and drive market demand and also protect consumer rights.

Many companies are operating in a rapidly changing technology environment where end user markets are struggling to keep track of technology options. Government has a role in alerting consumers to companies that take a lead in clean energies, to provide good consumer information supporting companies that have legitimate and demonstrable claims in the space and creating consumer confidence.

The education sector must also be considered both as an industry sector to address delivery of the skills required to build capacity and capability across industry, as well as to help in the delivery of behavioural change to the community through objective and practical information.

In particular at the tertiary level, initiatives to develop facilities that experiment in both established and innovative renewable power generation and embeds leading-edge research in sustainable energy in Kimberley educational institutions. In particular, on the professional side, we need diverse, empirical skills-based training for energy efficiency assessments and monitoring, auditing, verification for carbon accounting.

As a part of delivering education services, and with the strengths of the education market in Western Australia, these courses should also be promoted to foreign students as a part of Australia's role to help build international capacity. With resident foreign students, another potential of the market is to foster sustainability values.

Logical opportunities exist for potential partnerships with Singapore, which has a strong sustainable energy policy, and may represent a good strategic partnership to leverage projects across tropical and sub-tropical south-east Asia.

2. Research and development

There are logical fits for research and development programs that focus on the Kimberley's needs:

- Relevant design of passive energy efficient design for developing/innovating Kimberley buildings, and incorporating development and implementation of modelling programs used to assess and monitor the energy performance of buildings such as the National Australian Built Environment Rating System (NABERS), and NABERS Energy for offices to ensure they are adequate to meet the needs of the Kimberley;
- The Kimberley's potential to produce biomass for energy is hampered by a lack of efficient processes for producing ethanol from wood, inadequate commercial products from lignin, and the need for further development before diesel engines can be run on bio-oil for stationary power generation and transport;
- With Western Australia's size and the remoteness of the Kimberley, reducing transportation costs for delivery of primary energy product, such as biofuels for

use in distributed generation, is an important goal, as is the impact of energy price on transported goods;

- Transport options need to consider the manufacture of biofuels for both land and sea transportation;
- Energy storage is the key to solving intermittency of some RE supply (Parkinson 2013 a) – storage should be a focus of R&D and pilot programs – particularly important in demonstrating commerciality and reliability in remote generation and islanded supply; and
- Proximity to the south-east Asian market should be exploited by regional research that allows service delivery and training for developing/innovating in the region.

3. Market size

A limited size of the market for businesses in the Kimberley emphasises the need to create scale for local industry development by actively supporting market growth in local markets to both expand and to reach a sustainable level of operation. A key role of government in supporting industry developments is matching potential technology to SMEs as well as major industrial users and investors.

Market support from Government can be achieved through sourcing and procurement policy ensuring an integrated approach to incorporate green purchasing and safe purchasing.

4. Government operation specific issues

- Government agency structures continue to impede cross-portfolio decision making that is required for more sustainable outcomes, particularly as perverse competing demands between agencies and budgets impact on the budget process.
- Some agencies are less accepting of EE and looking at RE power supply, and this is likely to be exacerbated with new budget constraints. For Government to facilitate better outcomes in our energy use, clear commitments need to come from the Premier and Ministers to support all State Government agencies and instrumentalities adopting EE and RE and an engagement plan that fosters support from cabinet must be developed and implemented.
- The business case assessment needs an economic analysis that is life cycle based inclusive of non-economic cost-benefit analysis, and marginal abatement curves need to be cradle to cradle. Budget management process must be whole of life, not just focused on the capital works component – especially in community (taxpayer) funded projects – taxpayer funds pay for on-going operating as well as capital cost and so project planning (including budget documents, government budget commitments) must be inclusive of a total estimate of combined capital expenditure and operating expenditure, not simply a capital works estimate.

Describing strategies

1. Government leadership through direct market power

In the Kimberley, Government has the opportunity to make use of spending power of government operations, including community service provision, in the most efficient buildings, transitioning vehicle and transport fleets to higher efficiency, and then use renewable energy to help build capacity in the local market.

Procurement programs and purchasing strategies can be used as a powerful tool to create change in markets.

Iconic new community facilities can become leading examples of eco-efficient design, and so epitomise the best in efficiency in energy and water use, especially if those facilities are then powered with RE.

All new government housing and new public buildings must exceed a minimum 6 Star Plus performance level under the Building Code of Australia and use market power to develop and implement a minimum standard for currently occupied buildings at lease renewal. R&D for developing/innovating Kimberley buildings mentioned earlier should be actively adopted within existing and new government projects.

2. Government leadership through statutory power

A key part of economic development could be a Kimberley Energy Efficiency Fund to:

- identify EE priorities among small residential, commercial and small industrial users;
- enhance behavioural change for EE (similar to current water campaigns);
- create market transformation by support for procurement of energy efficient products and services;
- establish a rolling fund to support EE initiatives with commercial and industrial users; and
- use EE programs in all sectors and ensure that no end user is worse off as a result of rising energy costs associated with a carbon trading program.

As previously mentioned, programs that free up non-discretionary funds will contribute to economic development, and this also applies to business - opportunities for EE and uptake of RE across the primary industries including agriculture, fishing and mining, through the secondary industries including and transport, and through tertiary service industries including tourism, ensuring they also are a part of the solution and the Kimberley brand.

3. Government leadership through policy and planning of infrastructure

The key is ensuring a diversity of energy supply for electricity production. Over-reliance on a single source of supply is not wise. Further, we will always be exposed to inflationary effects of markets that rely on resource-extraction for energy with increasing demand side bound to drive up the price of fuel sources.

Biomass too can be much more targeted to regions where it is suitable to use.

Solar will not require as much infrastructure as before since it can be generated in location, although this is a cost saving that has not been factored into most traditional economic assessments of solar. If electricity is generated locally, revenues from generation can flow back to the local community.

Traditional views and traditional energy

Australia has extraordinary energy resources - great reserves of fossil fuels and other energy resources. While the energy from fossil fuel markets are bullish about the future of fossil fuels (IEA 2013b), fossil energy will increasingly come under pressure on global policies acting to internalise the costs of carbon.

Although changes to the Australian Federal Government brings new policies in relation to carbon pricing may impact in the short term (Edis 2013, Phys.org 2013b),

global momentum is creating change both in terms of the use of fossil fuels (Fahey 2013), and a growing commitment to carbon pricing as the tool of choice (Phys.org 2013a, 2013b, Reuters 2013), as well as rapdly growing community activism to divest fossil fuel investments (Marcacci 2013).

The views of incumbent administrators who may not accept the reality of change are most likely to make policy and investment decisions that lock in old technology that will then create an expensive legacy that may last for many decades – a bit like investing in a new typewriter factory in the 1990s.

Renewable opportunities in the Kimberley

The Kimberley has a wealth of sustainable energy resources and a remarkable array of opportunities for all forms of RE including biofuels, biomass, and biogas and extensive, high quality resources in solar and tidal, and potentially some limited usable wind resource.

If electricity is generated locally, revenues from generation can flow back to the local community.

Solutions may vary geographically, and so a ‘one size fits all’ approach may not be available for each location in the Kimberley. Applying the concepts of Jan Gehl's "Places for People" (Gehl 2013), brings fit-for-purpose technology that meets the needs of people, and build for people - don't build for transport, for industry, for business, but for the residents and community and users. A high quality interface is needed between the nodes required for economic performance and the small-scale detail of everyday life – getting this right improves liveability and supports economic activity in tertiary service provision.

A key challenge exists to tap into sustainable energy is – as with any other resource – remove barriers to explore, and provide incentives to ramping up exploration and map resources. Governments are generally the custodian of resource and climate data, and government support will be essential for data creation/acquisition and analysis – and determining availability and access to government databases. Another element is ensuring planning policy and land tenure keeps up to ensure access to solar, wind, wave, and geothermal resources.

Opportunities exist to use sustainable energy projects as a way of restructuring and refurbishing towns in the Kimberley, freeing up cash for discretionary spending and contributing to the renewal of flagging rural economies, creating more sustainable communities and towns.

1. Solar

Solar in the form of both solar PV and solar hot water are now the simplest and cheapest technology to rapidly deploy RE and deliver cost savings to individuals, business and the community broadly. With current electricity tariffs in the Kimberley (Horizon Power 2013) payback on installed solar should be as little as 3 years – a 33% return on investment. Payback on solar hot water is similar and there should be no restriction in moving to a greater deployment of solar hot water systems in the area.

Looking at the data for solar installation, the Kimberley appears to be lagging behind installation rates of both solar PV and solar hot water systems in the rest of Australia, and including climatically comparable areas in Northern Queensland.

However current infrastructure restrictions are limiting or preventing solar uptake of PV, and given the impact of utility pricing on discretionary spend, this should be a priority as a stimulus to local economies across towns and locales.

2. Biomass

Energy production in the Kimberley should logically include biomass – sustainable biomass that does not compete with food production or nature, and provides energy to own communities.

In biomass, apart from both bioethanol, biodiesel and electricity generation, additional opportunities lay in high-value wood products such as densified briquettes and wood pellets, charcoal, activated carbon and eucalyptus oil. Wood pellets are particularly attractive as they are in strong demand in Europe as a heating fuel and for co-firing with coal.

Renewable energy generation is generally more labour intensive, and more broadly distributed across regions. With a better employment factor, RE projects can lead to growth of local communities in the Kimberley, and establishment of RE generation projects will bolster a broad range of skills, particularly in agricultural regions.

Biomass sources – either biomass for electricity generation or feed stocks for bioethanol and biodiesel production – in particular will draw on and build the agricultural skill base already available in the region and bring demand for new engineering skills.

With changes in Federal Government, new policies of the Abbott Government place emphasise on soil storage of carbon (Abbott 2011), although there is yet to be any clarity on what this policy will bring (Bygrave 2013) and controversy on its viracity (Barbour 2013, Minasny & McBratney 2013). However, should these policies be put in place, this must be one area of priority for the Kimberley, especially around Kununarra and the Ord. Slow pyrolysis yielding biochar/agrichar for use in soils not only bolsters soil stored carbon, but also acts to improve soil productivity.

An additional resource source of waste to energy should also be considered with the policy and regulatory environment opening to greater utilisation of waste biomass.

3. Tidal

Significant tidal projects are being developed elsewhere in the world (Falconer 2013) and Tidal Energy Australia's plans recently receiving environmental approvals (Collins 2013) offers the possibility of progress in this development. However a business model that brings down the cost of generation using tidal energy and transmission to customers must compete with other generation sources including potentially solar or biomass.

4. Storage

Storage is understandably seen as the keystone to renewable energy. But while large-scale energy storage would on first pass seem to be the logical best solution for the electricity market to service renewables, will it be the main game? Storage has already been critical in the arrival of portable devices, and driven by demands of laptop computing and mobile (smart)phones. While stationary storage is certainly considered important, the electric vehicle market has probably already been responsible for the arrival of in excess of 20 GW of storage over the past 10 years. Meanwhile markets in Germany, New Zealand and now Australia are considering distributed domestic storage as likely drivers of storage requirements for the next few years (Parkinson 2013 a, 2013b).

In remote locations electricity sourced from battery storage partnered with solar is already cost competitive with electricity from diesel generation – and arguably more reliable, while on grid storage with solar has a payback period of around nine years.

5. Remote renewable successes in Australia relevant to Kimberley

Case studies from Magnetic Island and King Island offer real world examples of projects relevant to the scale of the Kimberley.

- Magnetic Island (population 2 000, area 52 sq. km) achieved peak PV penetration of 34% for the whole island during September 2012. The majority of the PV systems on Magnetic Island are small scale (< 10 kW) residential systems, with several larger systems of up to 22 kW and one 100 kW system at the public Solar Skate Park. Magnetic Island and Townsville Solar City provide a particularly useful case study as there has been extensive metering of the PV systems installed under the Solar Cities program. (APVA 2013, Parkinson 2013d)
- King Island (population 1 800, area 1000 sq. km). As with other remote locations, King Island traditionally used diesel to produce electricity. While inefficient and expensive, diesel is reliable. Before any renewable energy technologies came to the island, King Island residents were consuming 4.5 million litres of diesel each year. By 2011, mainly through the use of wind turbines, that number was down to 2.6 million litres. The King Island Renewable Energy Integration Project (KIREIP) hopes to further reduce that number to 1.6 million litres, meaning that 65 % of the annual electricity used on King Island will come from renewables, with shorter durations of 100% renewables power. (Guevara-Stone 2013).

Funding of similar projects for the Kimberley should be commercially based and will be able to draw on funds from the Australian Renewable Energy Agency (ARENA). ARENA has mandate to support “innovations that improve the competitiveness of renewable energy technologies and increase the supply of renewable energy in Australia” (ARENA 2013). ARENA has a $3 billion budget to fund to provide financial assistance for the development of RE technologies, from research through to commercialisation, and through knowledge sharing in relation to RE technologies.

Note that ARENA is retained under the new Federal Government’s Direct Action policy.

Renewables in the Kimberley in perspective

With plans for growth and diversification in the Kimberley, significant measures must be in place to ensure that the potential of new technologies delivering energy efficiency and renewable energy is reached as fast as possible with the cost savings that are implicit with the domestic source of energy realised. There is a key challenge to make the most of the opportunity within the Kimberley, to understand the current trends in energy and clean technology, and more particularly to avoid decisions that lock in old technology that will then create an expensive legacy that may last for many decades.

Solutions developed have the potential to be used within industry across the Kimberley, potentially brining on-stream projects with lower running costs where under traditional generation energy costs may have proven to have been prohibitive to new projects, or increasing energy prices debilitating to existing projects.

Targeting Energy Futures for the Kimberley

To establish measurable goals and to ascertain if real gains in energy savings and local energy production have been achieved, some targets need to be set. The following provide some examples for the early initiatives (as provided in the Executive summary) with suggested practical timelines and some goals.

Energy efficiency and management

2015: In association with new pilot projects on existing premises, demonstrate a minimum 30% energy saving through energy audit and implementation of energy savings measures and publish cost savings.
2018: 100% of businesses in Kimberley informed of cost savings from EE;
Minimum 30% of businesses undertaken energy audits, and improved energy management.
2025: Minimum 90% of businesses improved energy management
Monitor geographic takeup and compare economic metrics for business activity and local expenditure in different locations compared with takeup.

Education and training

2015: Courses established and running; public education program established
2018: Courses and student numbers maintained, trainees employed in relevant positions.
2025: Need met, course resources directed to 2025 technologies.

Regional uptake of solar PV, storage, and solar hot water on homes and businesses

2015: 20% with solar PV, 5% with storage, 40% with solar hot water.
2018: 50% with solar PV, 20% with storage, 70% with solar hot water.
2025: 90% with solar PV, 90% with storage, 95% with solar hot water.

R&D

2015: Research network on building performance, renewable liquid fuels, and renewable resource mapping complete and delivered to potential commercial proponents for larger projects (below).
2018: Implementation of new building performance in new projects, a commercial pilot plant producing liquid renewable fuels established; first large project utilising renewable resource map for optimal siting complete.
2025: Need met, resources already redirected to emerging 2025 technologies.

Larger renewable projects

2015: Commercial proponents progressing through approval process.
2018: At least one large project utilising renewable resource map for optimal siting completed. Further projects in development
2025: Need met, resources already redirected to emerging 2025 technologies:

Community and tourist projects

2015: Business case documented and disseminated to all community and tourist facilities.
Completion of at least one project for community and one project for tourist facility (selected by a public competition) in each major centre
Repeat for 3 years to 2018 as annual competition.
2018: Final year of program

Further tasks

The timelines above also need to be applied to other initiatives outlined in the body of the report. Practical timelines on the initiatives above are proposed at the end of the report.

An immediate secondary task is to encourage new commercial proponents for new renewable energy projects for the Kimberley and facilitate financial support available from ARENA for those projects.

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